SHORT

LONG

Rice Varieties

MEDIUM

TEXAS AGRICULTURAL EXTENSION SERVICE, THE TEXAS A&M UNIVERSITY SYSTEM, Daniel C. Pfannstiel, Director, College Station, Texas

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Rice Varieties

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Cultivated varieties of rice belong to the genus *Oryza* L., tribe Oryzeae and family Gramineae. Most cultivated varieties are the species *Oryza sativa* L., although varieties of the species *O. glaberrima* are cultivated in Africa. *O. sativa* is an annual but when moisture and temperature are optimum and diseases are absent, plants have survived and produced grain for 20 years or more. All rice varieties grown in the United States are in the species *O. sativa* L.

Commercial varieties are classified according to length of growing season, size and shape of grain and chemical character of the endosperm.

Based on length of growing season, varieties grown in the southern United States are divided into four maturity groups:

- Very early (100 to 115 days)
- Early (116 to 130 days)
- Midseason (131 to 155 days)
- Late (156 days or more)

Climatic conditions cause variations in the length of growing season for a particular variety. Normally, a longer period from seeding to maturity results if rice is seeded early in the season when temperatures are low. For photoperiod-sensitive varieties, duration of the vegetative cycle is reduced when rice is seeded later in the season. Some varieties sensitive to photoperiod will head at the same time of year regardless of seeding date. Early and very early-maturing groups now grown in the United States are relatively insensitive to photoperiod.

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When selecting the variety, farmers should consider market demand; length of harvest season and capacity of harvest, drying and storage facilities available at harvest time. Also, the selected variety should be adapted to the level of soil fertility attainable. Consider the variety's resistance to blast and straighthead in areas where these diseases affect yields. If double cropping is considered, varietal selection is critical, because only very early-maturing varieties consistently produce a second crop under Texas conditions.

Rice grown in the United States is classified as short-, medium- and long-grain varieties. In recent years, more than 95 percent of the Texas crop is long-grain rice. Short-grain varieties are grown principally in California and medium-grain varieties are grown mainly in Arkansas and Louisiana. A small acreage of medium-grain rice is grown in Texas.

One type of rice commonly known as "red rice" is a serious weed pest in all rice-growing areas of the U.S. Several strains of red rice exist and all are the same species as the commercially grown rices. They have red to almost black bran colors which the consumer finds objectionable in a mixture of ordinary white rice. Red rice is more vigorous and faster growing than commercial rice; farmers should prevent introducing this pest into a clean field. If red rice-infested fields are second cropped, the red rice matures before the second crop, shatters and reinfests the field.

Farmers are encouraged to use the highest quality seed available of a variety. Use of certified or registered seed is the best assurance of high quality. Certified seed are produced from foundation or registered seed by qualified seed growers under careful supervision and special procedures. Quality seed should be pure, have high germination and be free from red rice and

weed seed of all kinds. Foundation seed rice in Texas is produced by the Texas A&M University Agricultural Research and Extension Center at Beaumont.

Table 1. Rice varieties grown in Texas in 1978

Variety	Percent of acreage[1]
Labelle	87.90
Lebonnet	6.82
Bluebelle	1.63
Starbonnet	0.43
Nato	2.35
Brazos	0.72
Saturn	0.15

[1]The Rice Millers' Association Acreage Report — 1978

DESCRIPTION OF VARIETIES

Each variety is characterized by specific cooking and processing attributes. High quality, domestic, long-grain varieties usually cook dry and fluffy. Cooked grains tend to remain separate. In contrast, when cooked, high-quality, medium- and short-grain varieties are more moist and chewy than long-grain varieties, and the grains tend to stick or clump together. All three grain types with their characteristic textural qualities are in wide demand by domestic and foreign trade.

Today, rice breeders develop and release only varieties that possess inherent cooking and processing characteristics required by the ultimate consumer. The Regional Rice Quality Laboratory located at the Texas A&M University Agricultural Research and Extension Center at Beaumont performs specific physicochemical tests which guide rice breeders in developing new varieties with the desired quality in combination with the agronomic characteristics required by the rice industry.

Most varieties presently grown in the U.S. are joint releases of the respective state agricultural experiment stations and the Science and Education Administration of the U.S. Department of Agriculture.

Long-Grain Varieties

Very early-maturing varieties include the following list.

Labelle. Labelle is the leading rice variety grown in Texas and is planted on more acres than any other variety in the South. Its first and second crop yield potential and its high milling yield make it very popular with farmers and millers.

The variety was developed from the cross Belle Patna x Dawn and released in 1972 by the Agricultural Research and Extension Center at Beaumont. The spikelet of Labelle is straw-colored, smooth, awnless and has a faint anthocyanin pigmentation in the apiculus. It has slightly less lodging resistance than Bluebelle. The grain is slightly smaller than that of Bluebelle and about the same size as Starbonnet. Labelle averages 80 days from seeding to heading and the plant height averages 43 inches.

Labelle's milling, cooking, eating and processing qualities are typical of traditional U.S. long-grain rice. Its milling quality is outstanding, and the variety consistently produces higher whole-grain and total milled rice yields than other long-grain varieties. Dryer operators and millers consider Labelle one of the easiest varieties to dry and handle without adversely affecting milling yields. Average amylose content and alkali spreading score (gelatinization temperature type) for Labelle range from 23 to 25 percent and 3 to 5 (intermediate gelatinization temperature), respectively. These values are representative of good quality U.S. long-grain rices. Labelle is suitable for all products in which U.S. long-grain rice is used. This includes all forms of homecooked, long-grain table rice and processed products such as parboiled rice, quick-cooking rice, canned soups, frozen dishes and other convenience foods.

Labelle is resistant to U.S. races of blast fungus IH-1, IG-1 and IB-45 but susceptible to IC-17, as are all U.S. long-grain commercial varieties. Race IC-17 has become the prevalent race in Texas, because Labelle comprises 80 to 90 percent of the Texas acreage and Labelle is resistant to other races usually found in the South. The variety is resistant to straighthead but susceptible to kernel smut. Leaf smut, brown leaf spot and narrow brown leaf spot have not been serious problems with Labelle. White tip has never been observed in Labelle, which is susceptible to stem rot and sheath blight, as are all long-grain varieties grown in Texas.

Lebonnet. This variety was developed from the cross Bluebelle x (Belle Patna x Dawn) and released by the Texas Agricultural Research and Extension Center at Beaumont in 1974. The spikelet of Lebonnet is straw-colored, glabrous, awnless and the apiculus is colorless. The combination of a straw-colored hull and colorless apiculus distinguishes Lebonnet grain from that of other commercial long-grain varieties currently grown in the United States except Newrex. The straw-colored hull is a trait desired by parboilers.

The milled kernel of Lebonnet is larger than present U.S. commercial long-grain varieties. The larger grain size was one of the primary characteristics emphasized in the development of Lebonnet because of the preference in prime export markets for a larger grain size in long-grain rice.

Lebonnet's plant type most closely resembles Bluebelle among commercial varieties, but it may be somewhat more leafy than Bluebelle under high fertility conditions. At heading, the flag leaf of Lebonnet tends to remain upright. Lebonnet is about the same plant height as Bluebelle and Labelle. The period from seeding to maturity for Lebonnet and Bluebelle is essentially the same.

The first crop-yielding ability of Lebonnet is similar to Bluebelle and slightly higher than Labelle. The second crop-yielding ability of Lebonnet is below Labelle but above Bluebelle. Total and whole-grain rice milling yields of Lebonnet are below Labelle but are comparable to most other U.S. long-grain varieties. Its average amylose content ranges from 23 to 25 percent and its alkali spreading value from 3 to 5. Lebonnet is satisfactory for all products in which U.S. long-grain rice is used and is preferred in those products in which a larger milled kernel is desired.

Lebonnet is resistant to blast races IH-1, IG-1 and IB-45 and susceptible to IC-17. It is resistant to straighthead and white tip but susceptible to kernel smut. The variety is very susceptible to stem rot and sheath blight.

Bluebelle. Bluebelle was developed from a cross between a rogue from the variety Rexark and a selection from a cross of Century Patna 231 x (Hill Selection x Bluebonnet). It was released by the Agricultural Research and Extension Center at Beaumont in 1965.

Bluebelle grains are long and slender with smooth gold-colored hulls. The flag leaf is erect at heading and the variety has superior lodging resistance.

The first crop yield potential of Bluebelle is slightly better than Labelle and the second crop yield is less than Labelle.

Bluebelle possesses the traditional quality typical of U.S. long-grain varieties. It has good milling properties like most major U.S. long-grain rices. The milling yield is less than Labelle and about equal to Lebonnet. Bluebelle's amylose content ranges from 23 to 25 percent and its alkali spreading value from 3 to 5. Bluebelle is suitable for all products calling for U.S. long-grain rice.

This variety is rated moderately susceptible or susceptible to races IG-1, IC-17 and IB-45 of the blast fungus and resistant to IH-1. Bluebelle is moderately resistant to straighthead and brown leaf spot but susceptible to stem rot, narrow brown leaf spot, kernel smut and leaf smut and very susceptible to sheath blight.

Newrex. Newrex is a superior quality, very early-maturing, long-grain variety developed at the Research and Extension Center at Beaumont and released in 1979.

The variety was developed from a cross of an experimental selection derived from a cross of (Bluebelle x Dawn) x (Belle Patna x Dawn) and a selection derived from a backcross of Bluebonnet 50 and the Mexican variety Jojutla. It carries the superior processing qualities of Jojutla.

The spikelet of Newrex is straw-colored, smooth and awnless with a colorless apiculus. There is no purple pigmentation in any plant part. The grain is a typical long-grain type slightly longer than Labelle, Starbonnet and Bonnet 73. Its grains are about the same length, but narrower than Bluebelle and slightly smaller than Lebonnet. The variety is about 2 inches shorter than Labelle. The time from seeding to maturity for Newrex is almost identical to that of Bluebelle and Lebonnet and about a week later than that of Labelle.

The yielding ability of Newrex is similar to present U.S. long-grain varieties. Second crop-yielding ability of the variety is similar to Lebonnet and below Labelle.

Newrex's cooking, eating and processing qualities are markedly superior to traditional U.S. long-grain rices. It is outstanding for quick-cook processing, soup manufacturing and other related processes. The variety is distinguished from other U.S. long-grain varieties by an amylose content of 26 to 28 percent which averages 2 to 4 percentage points higher than present long-grain rice and by a low breakdown in cook paste viscosity at boiling temperature. These characteristics are representative of superior cooking, eating and processing qualities of long-grain U.S. rices. Newrex is superior for all products in which U.S. long-grain rice is used and is in demand by processors of quick-cook, canned and related rice products. The variety was developed to fill specific industrial needs.

The whole-grain milling yield is similar to Lebonnet and below Labelle and Starbonnet. It appears that Newrex may need to be harvested at a higher moisture content and dried with greater care than Labelle.

Newrex has blast resistance similar to Labelle and Lebonnet, but is less susceptible to race IC-17 which attacks Labelle and Lebonnet. The variety has resistance to races IH-1, IG-1 and IB-45 but is

rated moderately susceptible to race IC-17. The variety is susceptible to straighthead, kernel smut and stem rot. It is moderately susceptible to sheath blight, leaf smut and narrow brown leaf spot but has moderate resistance to brown leaf spot.

Early-maturing varieties include the following ones.

Della. This variety, released by Louisiana in 1971, is a scented or aromatic rice derived from a cross of the unreleased Rexoro-Delitus variety with a Rexoro-Zenith selection. The characteristic popcorn or nutty flavor and odor came from the Rexoro-Delitus parent which received it from Delitus. Della is a special-purpose variety suitable for consumers who appreciate its distinctive flavor.

Della has straw-colored hulls. Its yielding ability is about 90 percent of other current U.S. long-grain varieties. Plant height is similar to Labelle and lodging resistance is less than Bluebelle. It is less suited for second crop production than the very early-maturing, long-grain varieties.

The milling quality is satisfactory and the milled product has an attractive appearance. Its cooking quality is characterized as typical of long-grain varieties although it cooks less "dry" than some varieties.

Della is susceptible to straighthead, sheath blight, kernel smut, stem rot and leaf smut; moderately susceptible to narrow brown leaf spot; moderately resistant to brown leaf spot and resistant to white tip. The variety is resistant to blast race IH-1 and susceptible to IG-1, IC-17 and IB-45.

Midseason-maturing varieties consist of the following kinds.

Starbonnet. This is a short-straw, long-grain rice variety developed in the cooperative varietal improvement program and released for general production in Arkansas in 1967. It was derived from the cross Century Patna 231 x Bluebonnet. Compared to Labelle, Starbonnet averages an inch taller, matures about 3 weeks later and is slightly more resistant to lodging. Starbonnet grains are smooth, straw-colored with faint purple apiculi and usually awnless. Grains are similar in size to Labelle and its lodging resistance is slightly less than Bluebelle.

Because of its midseason maturity and lack of second crop potential, the variety has not had wide appeal with Texas farmers. It performs well in Arkansas and is the leading variety in that state where second-cropping is not important. In Texas, it has not yielded as well as the earlier maturing, long-grain varieties.

Starbonnet's milling, cooking, eating and processing qualities are characteristic of U.S. long-grain rice. Its milling quality is excellent and consistently produces high whole-grain and total milled rice yields. Its milling yield is comparable to Labelle. Average amylose content and alkali spreading score for Starbonnet range from 23 to 25 percent and 3 to 5, respectively. Starbonnet is suitable for all products in which U.S. long-grain rice is used.

It is resistant to blast race IH-1 and moderately susceptible or susceptible to IG-1, IC-17 and IB-45. It is moderately resistant to straighthead and resistant to white tip. It is susceptible to sheath blight, brown leaf spot, kernel smut, stem rot, leaf smut and narrow brown leaf spot.

Bonnet 73. This variety was developed in Arkansas and released in 1972. It is a selection from the cross C.I. 9453-Bluebonnet 50 x C.I. 9187.

Like Starbonnet, Bonnet 73 matures about 3 weeks later than Labelle and has no second crop potential. The variety is not grown in Texas and the acreage in Arkansas is minor.

The variety has straw-colored grain and is characteristically awnless with smooth leaves and hulls and considerably longer panicles which droop somewhat more than Starbonnet. The variety has moderately strong straw which lodges more than Starbonnet, especially under high nitrogen fertilization rates. Leaves of Bonnet 73 are more slender and darker than Starbonnet, and they tend to remain erect until heading when the flag leaf usually droops.

In Arkansas tests before its release, it produced 10 percent higher rough rice yields than Starbonnet, but ranked below Starbonnet in percent milling yields. Milling yields of Bonnet 73 generally are lower than those of other U.S. long-grain varieties. Milled kernels of Bonnet 73 and Starbonnet are similar in size and shape. The quality of Bonnet 73 is almost identical to Starbonnet.

Bonnet 73 is moderately susceptible or susceptible to races IH-1, IC-17 and IB-45 of the blast fungus and resistant to IG-1. The variety has resistance to white tip and moderate resistance to straighthead. It is moderately susceptible to brown leaf spot and sheath blight and susceptible to kernel smut, stem rot, leaf smut and narrow brown leaf spot. Tolerance to high pH soils is fair.

Medium-Grain Varieties

Included in the very early-maturing varieties are the following ones.

Vista. The variety was released by Louisiana in 1971. It was selected from an apparent hybrid plant found in a 1961 headrow block of a goldhull selection from Rexoro x (Lacrosse x Magnolia). The pollen parent may have been a strawhull selection from Nato x Calrose grown adjacently in 1960. The Lacrosse x Magnolia selection was a sister strain of Saturn.

Vista is a strawhull variety that matures earlier than Nato and Saturn. It is nonshattering and difficult to thresh. It matures about 5 to 10 days earlier and is approximately 3 to 4 inches shorter than Nato. It has better lodging resistance than Nato and responds to fairly high nitrogen fertilization levels. Because of vigorous regrowth, Vista has good potential for second cropping. Production records indicate that it generally outyields Nato by 5 to 10 percent.

The milling, cooking, eating and processing qualities of Vista are typical of traditional U.S. medium-grain rice. The variety is comparable to Nato in milling yields. Its milling quality in terms of whole-grain and total milled rice is excellent. Its average amylose content ranges from 13 to 16 percent and its alkali spreading value from 6 to 7. Vista is satisfactory for all products in which U.S. medium-grain rice is used.

The variety is susceptible to stem rot, white tip and leaf smut and moderately susceptible to sheath blight, brown leaf spot and narrow brown leaf spot. It is moderately resistant to straighthead and kernel smut and is considered to have poor tolerance to high pH. It is resistant to blast races IH-1, IG-1 and IC-17 but is susceptible to IB-45.

Early-maturing varieties include the ones discussed below.

Nato. This is the leading medium-grain variety grown in Texas. Nato, released by the Louisiana Agricultural Experiment Station in 1956, was selected from the progeny of the cross Rexoro-Purpleleaf x Magnolia. Its hulls are straw-colored and glabrous. The variety averages about 48 inches in height and is susceptible to lodging, especially with excessive nitrogen fertilization. It averages approximately 96 days from seeding to heading. Nato produces satisfactory first crop yields, but its growing season is too long for reliable second crop production.

Nato's milling, cooking, eating and processing qualities are typical of traditional U.S. medium-grain rice. Its milling quality is outstanding and consistently produces higher whole-grain and total milled rice than other medium-grain varieties. Average amylose content and alkali spreading score for Nato range from 13 to 16 percent and 6 to 7, respectively. These values are representative of good quality medium-grain U.S. rices. Nato is suitable for all products in which U.S. medium-grain rice is used. This includes all forms of home-cooked, medium-grain table rice and processed products such as dry breakfast cereals, baby foods, rice flours, brewing, convenience foods and snack foods.

It is susceptible to all prevalent races of blast fungus found in the U.S. It is somewhat resistant to narrow brown leaf spot, brown leaf spot and sheath blight; moderately susceptible to straighthead and susceptible to stem rot, kernel smut and white tip.

Saturn. This variety was released by the Louisiana Rice Experiment Station in 1964. It was developed from the cross of Lacrosse x Magnolia. It is not widely grown in Texas but is the leading medium-grain variety in Louisiana. It matures 3 to 4 days earlier and is about 4 inches shorter than Nato. Saturn has higher yielding potential than Nato, but is more susceptible to lodging. The variety has straw-colored hulls, is glabrous and lacks apiculus color. Because it is susceptible to lodging, soil type and fertility practices are important for successful production.

Saturn possesses typical U.S. medium-grain quality. Total and whole-grain rice milling yields of Saturn are good and usually compare favorably to most other U.S. medium-grain varieties. Its milling yield is lower than Nato. Its average amylose content ranges from 13 to 16 percent and its alkali spreading value is from 6 to 7. Saturn is satisfactory for all products in which U.S. medium-grain rice is used.

Saturn is very susceptible to narrow brown leaf spot and stem rot, but moderately resistant to kernel smut. It is susceptible to straighthead and resistant to blast races IH-1, IG-1 and IC-17, but susceptible to IB-45. It has replaced much of the Nato acreage in Louisiana where blast is a problem.

Brazos. This variety was developed from the cross C.I. 9545 x Nova and released by the Agricultural Research and Extension Center at Beaumont in 1974. The spikelet of Brazos is straw-colored, smooth and awnless and the apiculus is colorless. The grain shape is similar to typical medium-grain varieties, but is larger than other medium-grain varieties. The milled kernel

weight is greater than for Nato, Vista and Saturn as well as the short-grain variety Nortai.

In the vegetative and reproductive stages, Brazos is distinctly shorter than current medium-grain varieties. Mature plants average about 8 inches shorter than Nato and 4 inches shorter than Vista. Leaves of Brazos tend to remain upright. At heading, the panicles are well below the tips of the flag leaves and are barely visible. When seeded on the same date, Brazos generally heads before Nato, but in Texas the varieties mature about the same time, as the time from heading to maturity for Brazos is generally a little longer than for other medium-grain varieties.

Very high yield potential is the outstanding characteristic of Brazos. The stubble crop production of Brazos is less than for Vista. The variety has better lodging resistance than Nato and is similar to Vista in this respect.

Brazos' milling, cooking, eating and processing qualities are typical of traditional U.S. medium-grain rice. Its milling quality in terms of whole-grain and total milled rice is similar to Nova 76 and generally below that of other medium-grain varieties. Milled kernels usually show more chalky grains than other commercial medium-grain varieties. Its average amylose content ranges from 16 to 19 percent and its alkali spreading value is from 6 to 7. Brazos is satisfactory for all products in which U.S. medium-grain rice is used and is preferred for specific breakfast cereals and in brewing.

In disease resistance, Brazos is similar to Nato, except Nato is moderately susceptible to straighthead and Brazos is resistant. Brazos is susceptible to all prevalent races of blast fungus found in the U.S. and to kernel smut. It is moderately susceptible to stem rot, sheath blight and brown leaf spot and resistant to narrow brown leaf spot.

Mars. The variety, released by Arkansas in 1977, was selected from a cross between C.I. 9580, an unnamed selection from a Northrose x Zenith cross, and Saturn.

Mars has a straw-colored spikelet, short straw and possesses lodging resistance superior to Nato and Saturn. When compared to other medium-grain varieties, Mars has narrower and darker green leaves. It averages 6 to 7 inches shorter than Nato, 3 inches shorter than Nova 76 and Vista, but 2 inches taller than Brazos. The variety averages 4 days later than Brazos in heading, but 3 to 5 days earlier than Nova 76 and Nato, respectively.

In cooperative performance trials, Mars has produced rough rice yields about equal to those of Saturn and Nova 76, superior to those of Nato and Vista, but below those of Brazos and Nortai. In Texas, Mars yields are consistently below those of Brazos in research plots.

Milled kernels of Mars are larger than those of Nato and show less chalkiness than kernels of Brazos. Average whole-grain milling yields of Mars are better than those of Brazos and Nova 76, but consistently less than those of Nato, Vista and Saturn.

Mars is another medium-grain variety possessing the traditional quality of this grain type. Mars' amylose content ranges from 13 to 16 percent and its alkali spreading value is from 6 to 7. Mars is suitable for all products calling for U.S. medium-grain rice.

The variety is resistant to blast races IH-1, IG-1 and IC-17 and moderately susceptible to IB-45. It is resistant to white tip and narrow brown leaf spot, moderately resistant to straighthead and kernel smut, but susceptible to leaf smut and moderately susceptible to sheath blight, brown leaf spot and stem rot.

Nova 76. Developed and released by Arkansas in 1976, it is grown on a limited acreage in that state. It was selected from the cross C.I. 9580 x Nova 66. Plants of Nova 76 average 5 inches shorter than Nato. The spikelet of Nova 76 is straw-colored, smooth and awnless and the apiculus is colorless. Grains are considerably larger than Nato. Milled kernels usually are translucent with little chalkiness. The variety has better lodging resistance than Nato and Saturn.

Nova 76 has longer and wider leaves than any other currently grown U.S. rice variety. The variety performs well in Arkansas, but in Texas and Louisiana the rough rice yields of Nova 76 are lower than all other medium-grain varieties. Whole-grain, milled rice yields of Nova 76 are lower than other U.S. medium-grain varieties except Brazos.

Nova 76 is moderately susceptible to straighthead, sheath blight, kernel smut, stem rot and narrow brown leaf spot. It is susceptible to brown leaf spot and leaf smut. It is resistant to blast race IG-1, moderately resistant to race IC-17 and moderately susceptible to races IH-1 and IB-45.

Short-Grain Varieties

There is little market demand for short-grain varieties in the southern rice-producing area, but

Arkansas produces a small acreage. California is the main short-grain production area in the United States.

Nortai. This variety, released by Arkansas in 1972 as a replacement for Caloro, was derived from the cross Northrose x P.I. 215936. Nortai spikelets are characteristically awnless and smooth. The keel may have a few hairs. The apiculus, apex of the grains and the outer glumes carry the purple coloring of the P.I. 215936 parent. The purple pigmentation on the panicles usually is rather pronounced at heading, but the intensity diminishes at maturity. Hulls usually are light yellowish-gold when the grains mature. The purple coloration of Nortai distinguishes it from all other commercial rice varieties presently grown in the United States.

Nortai has excellent yield potential, approaching that of Brazos, and is superior to other U.S. varieties grown in the South. It has good milling quality like most U.S. short-grain varieties and typical short-grain cooking and processing qualities. Its amylose content ranges from 16 to 19 percent and its alkali spreading score is from 6 to 7. Nortai is suitable for all products in which U.S. short-grain rice is used and is preferred in specific breakfast cereals and in brewing.

Nortai is resistant to straighthead and has fair tolerance to high pH soil. It has resistance to white tip and is moderately resistant to kernel smut. This variety is moderately susceptible to stem rot, brown leaf spot and narrow brown leaf spot and moderately resistant to sheath blight. It is resistant to blast races IH-1 and IC-17 and only moderately susceptible to IG-1 and IB-45.

Glutinous or Waxy Varieties

Waxy varieties, commonly called glutinous, differ from common varieties in that they contain only amylopectin starch in the endosperm. Glutinous rice, grown on about 1,000 acres in California annually, is a specialty crop and the acreage needed to meet market demands has been small. Historically, the principal use of glutinous rice has been for preparing oriental ceremonial foods and confections. In some countries, glutinous rice is harvested slightly green, is lightly parched before milling and is used as a breakfast food. Recent research has shown that glutinous rice flour has a special use in the frozen food industry. The flour, when made into foods for freezing, such as white sauce and desserts, resists synersis (separation or weeping) when thawed after freezing.

Mochi Gomi is the variety of this type grown in California. It is a short-grain, midseason variety.

DISEASES

Disease is a major constraint on getting full yield potential of rice varieties. Consequently, breeding for disease resistance is an important part of the rice varietal improvement program in the southern U.S. Sometimes a rice farmer can avoid, or at least minimize, potential disease problems by proper selection of varieties. The following tables summarize the disease reactions of the rice varieties discussed in this publication.

Table 2. Reaction of indicated rice cultivars to the International Races of Pyricularia oryzae Cav., the organism causing rice blast disease

Cultivar	IH-1	IG-1	IC-17	IB-45
Bluebelle	R	MS	S	MS
Bonnet 73	MS	R	S	MS
Brazos	S	S	S	S
Dawn	R	R	S	R
Della	R	S	S	S
Labelle	R	R	S	R
Lebonnet	R	R	S	R
Mars	R	R	R	MS
Nato	S	S	S	S
Newrex	R	R	MS	R
Nortai	R	MS	R	MR
Nova 76	MS	R	MR	MS
Saturn	R	R	R	S
Starbonnet	R	S	S	MR
Vista	R	R	R	S

R-resistant; M-moderately; S-susceptible

Table 3. Reaction of indicated rice varieties to common diseases of rice in the United States

Disease and causal organism	Bluebelle	Bonnet 73	Brazos	Dawn	Della	Labelle	Lebonnet	Mars
Straighthead (physiological)	R	MR	MR	VS	S	R	R	MR
Sheath blight *Rhizoctonia Solani* Kuhn.	VS	MS	MS	VS	S	VS	VS	MS
Brown leaf spot *Helminthosporium oryzae* Van Breda de Haan	MR	MS	MS	MR	MR	MS	MR	MS
Kernel smut *Neovossia horrida* (Tak.) Padwick and Azmat Khan	S	S	S	S	S	S	S	MR
Stem rot *Sclerotium oryzae* Catt.	S	S	MS	S	S	S	VS	MS
White tip *Aphelenchoides besseyi* Christie	R	R	MR	R	R	R	R	R
Leaf smut *Entyloma oryzae* H. and P. Syd.	MS	S	MS	S	S	MS	S	S
Narrow brown leaf spot *Cercospora oryzae* I. Miyake	S	S	R	MS	MS	MS	S	R
Tolerance to high pH soil (7.0 to 7.6)	--	Fair	--	Fair	--	Fair	--	--

R-resistant; M-moderately; S-susceptible; V-very

Table 4. Reaction of indicated rice varieties to common diseases of rice in the United States

Disease and causal organism	Nato	Newrex	Nortai	Nova 76	Saturn	Starbonnet	Vista
Straighthead (physiological)	S	S	R	MS	S	MR	MR
Sheath blight *Rhizoctonia Solani* Kuhn.	MS	MS	MR	MS	MS	S	MS
Brown leaf spot *Helminthosporium oryzae* Van Breda de Haan	MS	MR	MS	S	S	S	MS
Kernel smut *Neovossia horrida* (Tak.) Padwick and Azmat Khan	S	S	R	MS	MR	S	MR
Stem rot *Sclerotium oryzae* Catt.	S	S	MS	MS	VS	S	S
White tip *Aphelenchoides besseyi* Christie	S	R	R	--	S	R	S
Leaf smut *Entyloma oryzae* H. and P. Syd.	MS	MS	S	S	S	S	S
Narrow brown leaf spot *Cercospora oryzae* I. Miyake	MS	MS	MS	MS	VS	S	MS
Tolerance to high pH soil (7.0 to 7.6)	--	--	Fair	--	--	Poor	Poor

R-resistant; M-moderately; S-susceptible; V-very

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